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ARMORED FORCE MEDICAL RESEARCH LABORATORY

FORT KNOX, KENTUCKY

INDEXED

PROJECT NO. 1 - COLD WEATHER OPERATIONS

Final Report On

Sub-Project No. 1-22 - Outfit, Combat, M-1943, Experimental
Test No. OQMG-140

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May 3, 1943

ARMORED FORCE MEDICAL RESEARCH LABORATORY
Fort Knox, Kentucky

Project No. 1-22
727-3 GNOML

May 3, 1943

1. PROJECT: No. 1 - Cold Weather Operations. Final Report on: Sub-Project No. 1-22, Outfit Combat, M-1943, Experimental Test No. OQMG-140.

a. Authority - Letter Headquarters Army Ground Forces, Army War College, Washington, D.C., File 420/117 GNRQT-6/32364, Subject: Outfit, Combat, M-1943, Experimental -- Test No. OQMG 140, dated February 25, 1943, and 1st and 2nd Indorsements thereto; and Letter Headquarters Armored Force, Fort Knox, Kentucky, File 422.11 GNOHD, same subject, dated March 2, 1943. See Inclosure No. 1.

b. Purpose - To test under actual service conditions in the field the temperate zone portion of the newly designed four zone outfit, combat M-1943.

2. DISCUSSION:

On the basis of study of world-wide climates with reference in particular to variations in wind velocity and temperature, the OQMG has established four clothing zones; tropical, temperate, cold and arctic. Clothing has been designed to provide optimum protection for the average climatic conditions of each zone, and adequate protection for the worst conditions encountered. The tropical issue serves as the basic layer, and as far as possible, extra items are provided as additional protective layers for each colder zone. It is the intention to standardize all equipage so that identical items will be used by all arms.

The present test was carried out, using a light tank company, of the 92nd Reconnaissance Battalion, 12th Armored Division, Camp Campbell, Kentucky, on bivouac for 17 days. The articles to be tested were issued to 30 men of the company from cook to commander; the complete outfits were worn for the entire test period. Additional test articles were distributed individually to other men to be worn in conjunction with the standard issue equipment.

In an additional period of observation, tank-crew and maintenance men of the Field Test Division of the Armored Force Medical Research Laboratory wore the test clothing for a period of one week, while operating medium tanks.

The report in detail is contained in 3 appendices:

Appendix 1 - A summarized statement of the merits, faults, and suggested alterations of each item of the issue based on observations made during the test, with comments on the outfit as a whole, including answers to the specific questions in the test directive.

Appendix 2 - Outline of the program of activities and weather conditions encountered during the test period.

Appendix 3 - A series of Photographs of the test items in use.

3. CONCLUSIONS:

a. The following items of the proposed combat outfit for the temperate zone were found to be suitable for Armored Force personnel:

- (1) Boots, field M-1943, rubber outsole.
- (2) Socks, cushion sole.
- (3) Sweater, high neck.
- (4) Belt, pistol or revolver.
- (5) Pocket, cartridge, magazine, Cal. .30-1.
- (6) Pack, jungle.

b. Without further modification the following items are considered to be unsuitable for Armored Force personnel:

- (1) Bag, sleeping, wool.
- (2) Case, bag, sleeping.
- (3) Canteen, collapsible, 2-quart.
- (4) Suspenders, trousers.
- (5) Trousers, field M-1943 Model AA
- (6) Jacket, Field M-1943 Model AA
- (7) Coat, Field M-1943.

c. The following items are not considered suitable for Armored Force personnel.

- (1) Tent, poncho, sectional.
- (2) Boots, Field M-1943 - Hobnail, heel and toe plates.
- (3) Trousers, Field M-1943, Model CC.
- (4) Jacket, Field M-1943, Model BB.

4. RECOMMENDATIONS:

a. That the articles of the temperate zone issue Outfit Combat, M-1943 found suitable be considered for use by the Armored Force.

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b. That the articles found to be unsuitable in their present form be reconsidered by the Armored Force after the correction of present defects.

c. That the articles found to be unsuitable, not be considered for use by the Armored Force.

Submitted by:

Capt. Steven M. Horvath, Sn.C.
Lieut. Arthur Freedman, M.C.

APPROVED

Willard Machle

WILLARD MACHLE

Colonel, Medical Corps,
Commanding.

4 Incls:

- # 1 - Letters of Authority
- # 2 - Appendix 1
- #3 - Appendix 2
- # 4 - Appendix 3
Photographs

1. The first part of the report
2. The second part of the report
3. The third part of the report
4. The fourth part of the report
5. The fifth part of the report

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10. The tenth part of the report

422.11 (2-25-43) GNOHD

1st Ind.

HEADQUARTERS ARMORED FORCE, Fort Knox, Kentucky, March 3, 1943.

To: Commanding General, Army Ground Forces, Army War College, Washington, D.C.

1. This headquarters has reallocated, Test No. OQMG - 140, "Outfit, Combat, M-1943, Experimental," from the Armored Force Board to the Armored Force Medical Research Laboratory due to the fact that the latter has more adequate facilities and personnel for conducting a test of this nature.

2. It is requested that future directives for test of clothing or items of a similar nature be transmitted without specifying the testing agency thereby permitting this headquarters to allocate the test to agency best suited to carry out the action.

3. Approval of action outlined in paragraph 1, above, is requested.

For the Commanding General:

/s/ C. M. Wells,
C. M. WELLS,
Lieut. Colonel, A.G.D.
Assistant Adjutant General.

1 Incl:

#1 and #2 w/d

#3 - Ltr. HQ.AF, file
422.11 GNOHD,
(3-2-43) (Added)

420/117 GNRQT-6/33794
(2-25-43)

2nd Ind.

HQ., ARMY GROUND FORCES, Army War College, Washington, D. C.

To: Chief of the Armored Force, Fort Knox, Kentucky.

The reallocation of Test No. OQMG-140 "Outfit, Combat, M-1943 Experimental," from the Armored Force Board to the Armored Force Medical Research Laboratory is approved.

By command of LT. GEN. McNAIR:

/s/ JAMES D. TANNER
JAMES D. TANNER,
Lt.Col., AGD.
Asst. Ground Adj. Gen.

1 Incl. n/c

Headquarters

ARMY GROUND FORCES

Army War College
Washington, D.C.

420/117 GNRQT-6/32364
(2-25-43)

Feb. 25, 1943

SUBJECT: Outfit, Combat, M-1943, Experimental -- Test No. OJMO - 140.

TO : Chief of the Armored Force, Fort Knox, Kentucky.

1. It is desired that the Armored Force Board conduct an expedited service test on forty (40) Outfits, Combat, M-1943, Experimental - Test No. OJMO - 140 in general accordance with the attached test data sheet No. OJMO-T-140.

2. Upon completion of the test it is desired that this headquarters be furnished four (4) copies of the Armored Force Board report, and report reach this headquarters not later than March 20.

BY COMMAND OF LT. GEN. McNAIR:

/s/ C. H. Day
C. H. DAY
Colonel, A. G. D.,
Asst. Ground Adj. Gen.

2 Incls.

Incl. #1 - Test Data
Sheet No.
OJMO-140
w/Questionnaires.
Incl. #2 - Cy tentative Combat
Uniform T/Ba, 2-17-43.

- 2 -

Incl. # 1

HEADQUARTERS ARMORED FORCE
Office of the Commanding General
Fort Knox, Kentucky

422.11 GNOHD

March 2, 1943

SUBJECT: Outfit, Combat, M-1943, Experimental Test No. OQMG - 140.

TO : Commanding Officer, Armored Force Medical Research Laboratory,
Fort Knox, Kentucky.

1. It is desired that the Armored Force Medical Research Laboratory conduct the test as outlined in letter Army Ground Forces to Chief of Armored Force, file 470/117 GNRQT-6/32364, subject: Outfit, Combat, M-1943, Experimental Test No. OQMG - 140, dated February 25, 1943.

2. Close liaison will be established with the Armored Force Board to secure the test clothing immediately upon its arrival.

By command of Lieutenant General DEVERS:

/s/ T. E. Sims
T. E. SIMS
Captain, A. G. D.
Asst. Adjutant General

1 Incl:

Ltr AGF file 470/117
GNRQT-6/32364 (copy)
w/incls. w/1st Ind.

APPENDIX 1

General Statement

Among Armored Force personnel, members of tank crews have special needs in so far as clothing requirements are concerned. These requirements arise out of (1) the necessity for rapid passage through tank hatchways, and (2) the need for maximum body freedom in the limited space available in a tank. For greatest efficiency a streamlined two-piece garment with no bulging is desired. Other personnel of the Armored Force are not bound by these limitations and their equipment requirements are similar to those of infantry.

Boot, Field M-1943

This is a superior item. When given the opportunity to retain any one item of the Outfit (other than the coat, field), at the termination of the test, 85% of the men elected to keep the boots. The boots "break in" easily and are reasonably waterproof, shedding water without the application of Dubbin.

The hob-nailed boots were found to be a menace on and in tanks since they do not provide traction on metal surfaces. The hob-nails, metal plates and rivets are conductors of heat and may cause excessive heat loss from the feet to cold ground. The hob-nails wore excessively during the 17 day test period.

The shin guard does not fit snugly to slender legs; small twigs and rain enter and make the wearer uncomfortable. Perhaps a single layer of leather for the shin guard would wear as long, and fit better than the present double thickness. For added protection the depressions over the welt nails should be covered by an insole.

Socks, Cushion Sole

These are satisfactory. Their greater bulk as compared with the present C.I. socks must be considered in the selection of shoe sizes for issue. The socks did not reach to the boot top.

Pack, Jungle

The pack is very satisfactory for ground troops. It balances well, accommodates all necessary equipment and can readily be packed or unpacked in the dark. The zippered pouch, even if the waterproof lining is omitted, is a useful adjunct. When the pack is supported by the shoulder straps alone, it can be taken off with ease. When it is fully attached to the

belt, however, it is as difficult to remove as the old pack. The contents of the pack became wet after immersion in water.

The pack was not entirely satisfactory for stowage in tanks. Because of its size, it could not be transported inside the M5 light tank and if placed on the rear deck, it interfered with traversing of the turret. In this position it constitutes an additional fire hazard. It can easily be camouflaged.

Tent, Poncho, Sectional

This item is acceptable neither as raincoat or shelter half. When worn as a raincoat, it leaks badly at the neck. The flaps interfere with movements of the arms and legs and the long ends may trip a soldier when mounting tank as well as interfere with ingress and egress. The ends blow about in the wind and permit rain to drench the wearer from the knees down.

Two ponchos make a tent only large enough for two slender men, 5'6" in height. It will not accommodate tall men, and is not high enough to permit dressing and undressing inside, thus limiting its usefulness in cold or wet weather.

The combined use of this item as a tent and poncho makes it necessary to strike the tent in order to have protection from rain during the day. As a result there is available no cover for equipment and, at best, an inadequate raincoat. The ground sheet which is provided with this combination is a desirable feature but any raincoat would serve the same purpose well if an extra length of material were attached to the bottom to be buttoned up underneath during the day. If the poncho, tent, sectional is pitched as a shelter half, the resulting cover has large openings at both ends and does not afford as good protection as the issue shelter half. The present shelter half can be used as an emergency raft. For the poncho to be so used, the neck opening must be closed. When this was done, leakage could not be prevented despite careful taping with adhesive.

An effective, light-weight shelter half could be made of waterproofed poplin or other closely woven material. The approximate shape and size of the issue shelter half should be retained to provide space for equipment.

Canteen, Collapsible

This canteen is carried more easily than the present one of rigid construction. It may keep water cooler in summer, since the outer cover will occasionally be wetted. The two-part size is desirable for troops in hot deserts and jungle areas, and for isolated groups on extended missions. The canteen should be attached to the belt rather than to the back of the pack, since, in the latter case, it is necessary to stow the pack in order to

drink. The attachment device is unhandy and unreliable and requires redesign. The cup which is part of the present rigid canteen assembly is one of the most useful items of mess equipment. The lack of a cup with the collapsible canteen is a serious deficiency and other provisions must be made. The plastic cap on the collapsible canteen is easily broken. The full canteen, however, resists breaking even when jumped or fallen upon.

The polyvinyl chloride canteen liner imparts a disagreeable taste to the water which, however, is said to disappear after use. Further observations are needed on this point, and on the possible influence of heat, chlorine, iodine, and salt on this liner.

Sweater, High Neck

This is a very satisfactory garment.

Belt, Pistol or Revolver

The belt is satisfactory for its purpose. Some effort should be made to limit the number of belts a fully equipped soldier is obliged to wear. In summer belts prevent the circulation of air under clothing and thereby interfere with evaporative cooling. They also obstruct pocket openings, limiting the usefulness of the abundant pocket space in the new outfit.

Pocket, Cartridge, Magazine, Cal. .30, M-1.

This item is satisfactory.

Cap, Ski

The cap is warm and waterproof. When it is worn under the helmet liner or crash helmet the buckle pressed uncomfortably against the forehead. The buckle strap is insecurely sewn to the cap, and pulls loose easily.

Suspenders, Trouser

The suspenders are helpful in supporting trousers with loaded pockets. Redesign of this item is necessary since the suspenders slide off the shoulders of some individuals and rub on the shoulder prominences of others.

Coat, Field

The field coat is the most outstanding item of the new outfit for warmth, comfort, appearance and general utility. With the liner, it is warmer than the O.D. overcoat; without the liner it is an effective wind breaker, topcoat and raincoat. Its flexibility permits its use on and in

like. The large pockets are useful for carrying a variety of equipment, e.g. maps, dry gloves and socks. The pockets may also be used for warming the hands, though perforating slits over the breast would make it possible to bring the hands closer to the heat of the body. The coat or its liner will also serve as a ground sheet or foot blanket, but is inadequate as a substitute for the blanket roll. As suggested for all raincoats, the collar should be redesigned to serve as a hood for protection of the neck from rain, and of the face from cold wind.

Trousers, Liner, Pile

Jacket, Liner, Pile

Not received for test.

Trousers, Field, M-1943, AA and CC

The trousers have two undesirable features when used by tank crews. One is the flare of the sides, and the cargo pockets interfere with passage through tank hatchways. The loaded pockets tear on projecting tank parts. Locating the pockets somewhat forward, will prevent the contents sliding back and interfering with sitting. The pockets should be inside the trousers and have slanting slit openings, since the contents fall out when the wearer is in the prone or supine position. The buttons and flaps are not especially helpful and they interfere with access to the pockets. The arrangement of buttons leaves the center of the opening uncovered by the flap when the pocket is loaded. The pockets are not entirely suitable for carrying ammunition since they make running very difficult and grenades bruise the thighs when carried similarly.

The trouser material rips or snags readily - that of the CC trousers more than that of the AA. The hip adjustment of the CC trousers is preferred to that of the AA.

The effects of repeated washing, of removal of grease, of battery acid, and of fire on the material require investigation.

Jackets, Field, M-1943, AA and BB

The material of the jacket snags and rips, especially on barbed wire, more so than the coverall HET and the present winter combat outfit.

When filled, the pockets are a handicap to tank crews, as were the trouser pockets. These and the skirts of the jackets interfere with ingress and egress. When the various belts are worn, the pockets cannot be used.

Some men wore their jackets inside the trousers, to achieve a more streamlined garment. A draw string, suggested for bottom of the jacket, would probably become unserviceable within a very short period.

The BU jacket was not warm at 35°F above, when worn over three other layers of clothing. This may have been due to the lack of a belt, and the AA jacket may be more satisfactory from this standpoint. For ground troops, the pouch on the back is probably desirable, since it can accommodate a large load, if the belt is properly used for support. It interferes when used by tank crews. The zipper closure could well be replaced by buttons, since the type of load likely to be carried in the pouch would scarcely fall out, and the pouch is in any event inaccessible unless the soldier removes his jacket.

The jackets fit well, do not pull away from the neck, and comfortably accommodate several layers of clothing underneath. The bi-swing back increases freedom of motion. After washing in the field, the jackets lose their neat appearance.

The shing buttons should be replaced with dull ones. In freezing weather button closure is probably more satisfactory than the present zipper because of the greater ease of handling.

As mentioned above under discussion of the trousers, dry cleaning for removal of grease, ease of ignition of the cloth, and the retention of the cravatting after several launderings remain to be investigated. Steam washing is difficult because of the resistance of the cloth to wetting.

Bag, Sleeping, Wool

For many men this bag was too small, principally because of the mummy shape with narrowing around the feet. In some cases the feet became cold enough at 35°F to require an extra foot covering. The escape-type zipper tends to open when pulled up to the neck, and should be replaced with one of standard design. The string ties on the bag cannot be used in the dark, nor can they be used in conjunction with the zipper. A cloth flap should be provided to keep the cold zipper from touching the body and a better method of anchoring the wool bag inside the case is needed.

Case, Bag, Sleeping

The same comments concerning size of the wool bag apply equally to the case. The method of closure can be improved, and the opening should not be placed directly over the opening of the wool bag. The fabric is sufficiently water repellent.

It is believed that the wool sleeping bag and case are satisfactory in principle and it is possible to transport them more conveniently than two blankets.

APPENDIX 2

SUMMARY OF SCHEDULE FOLLOWED BY COMPANY D DURING TEST PERIOD

DATE	WEATHER T ^{OP}		ACTIVITY ENGAGED IN
	0930	and 2130	
4/2/43	-	-	Shoes issued.
4/3/43	53-56	Fair	Issue of Clothing; Divisional Obstacle course; moved to bivouac area as Company problem; Tactical bivouac made after dark.
4/6/43	47-58	Fair	Platoon problems. (Those involved sections covering a variety of tactical situations necessitating building corduroy roads, damming creeks, releasing bogged tanks, etc.)
4/7/43	60-72	Fair	Platoon problems.
4/8/43	66-74	Fair	Company problems. Similar to platoon problems but after situation was in hand, the company walked around area to see how each platoon carried out its share of mission.
4/9/43	66-68	Rain-Clear	Company problems.
4/10/43	63-63	Rain-Clear	Company problem; Parks and laundry of equipment and clothing.
4/11/43	50-70	Fair	Special platoon problem; Move into new tactical bivouac.
4/12/43	40-55	Overcast-Rain	Rest in Bivouac area.
4/13/43	57-61	Rain-Clear	Beginning of Ranger Training - 0800-1130 - Hand to hand combat, Judo, calisthenics. 1300-1700 - Cliff scaling, calisthenics.

DATE	0930	WEATHER T ^{OF} and	2130	ACTIVITY ENGAGED IN
4/14/43	36-58	Overcast-Clear		0800-1130 - Scouting techniques; recognition and quieting of foreign sentries. Range distance identification. 1100-1630 - Stream crossing.
4/15/43	38-52	Overcast		0800-1130 - Wire entanglements. 1300-1630 - Camouflage. 1800-2030 - Night ambush.
4/16/43	54-54	Rain-Overcast		Parks: Rest; moved into new tactical bivouac.
4/17/43	54-59	Rain-Overcast		Firing of .30 Cal. machine gun.
4/18/43	53-53	Rain-Overcast		Moved into administration bivouac; Firing of .30 Cal. machine gun.
4/19/43	50-49	Rain-Overcast		Firing of .30 Cal. machine gun.
4/20/43	42-43	Rain-Clear		Firing of .30 Cal. machine gun; making targets and firing of 37mm guns; moved into garrison after dark.
4/21/43	45-56	Clear		Twenty-five mile road march with full pack.
4/22/43	-	Clear		Parks: Regular garrison schedule; interviews.

PHOTOGRAPH 1



Musette bag and blanket roll compared with Pack,
Jungle

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PHOTOGRAPH 2



Comparison of size of Tent, Poncho, Sectional with
that of issue shelter half

PHOTOGRAPH 3



Canteen, Collapsible, showing broken cap. Not shown
is separation of neck from shoulder of water bag.

PHOTOGRAPH 4



Appearance of officer in Uniform, Combat, M-1943, Experimental, with full equipment. Pockets obviously inaccessible, and circulation of air to upper part of body restricted.

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Two maintenance men - Left: wearing trousers, jacket, and cap of Outfit, Combat M-1943 Experimental. Right: wearing denim trousers and issue field jacket.

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Uniform, Casual, M-1941, Experimental, with jacket worn
inside trousers.

PHOTOGRAPH 7



Appearance of partially loaded pouch of Jacket, Field
M-1943 - Type AA.

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PHOTOGRAPH 8



Posed Photograph Illustrating:

(1) Boot, Field M-1943 hob-nail - showing spontaneous break in sole and also wear of hob-nails and plates after 16 days use. (2) Trousers, Field M-1943, Type CC. (a) Right cargo pocket torn on gear shift lever of M-3 light tank (b) Tear in trouser leg at point of attachment of pocket. (c) Appearance of left cargo pocket when loaded. (3) Jacket, Field M-1943, Type AA. (a) Appearance of left cargo pocket when loaded. (b) Barbed wire tears on jacket front and on sleeve. (4) Cap, Ski. Buckle strap torn loose.

